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GB 2089452 A GB 2036214 A GB 0936222 A
EP 0083881 A US 4225021 A

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(54) "Integral Structure for Disc Brake Unit"

(57) An integral califer structure consisting of parallel, opposite side brackets (2) and crosspieces (3) integral to each other, comprises aligned, opposite cylindrical seats (6) to contain and guide the drive pistons (7), formed in the inner part of said opposite brackets (2), in such a way that the rear walls (10), on which the action of the drive fluid is exercised, are integral to said brackets (2).

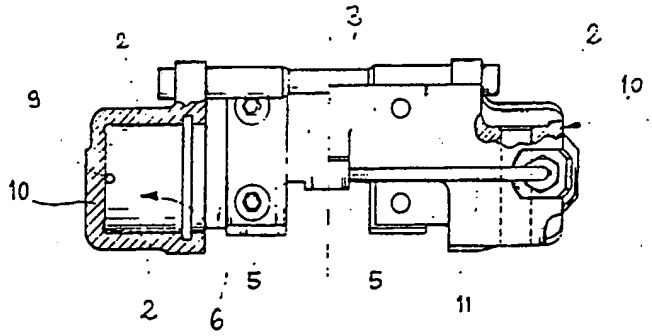

Fig. 3

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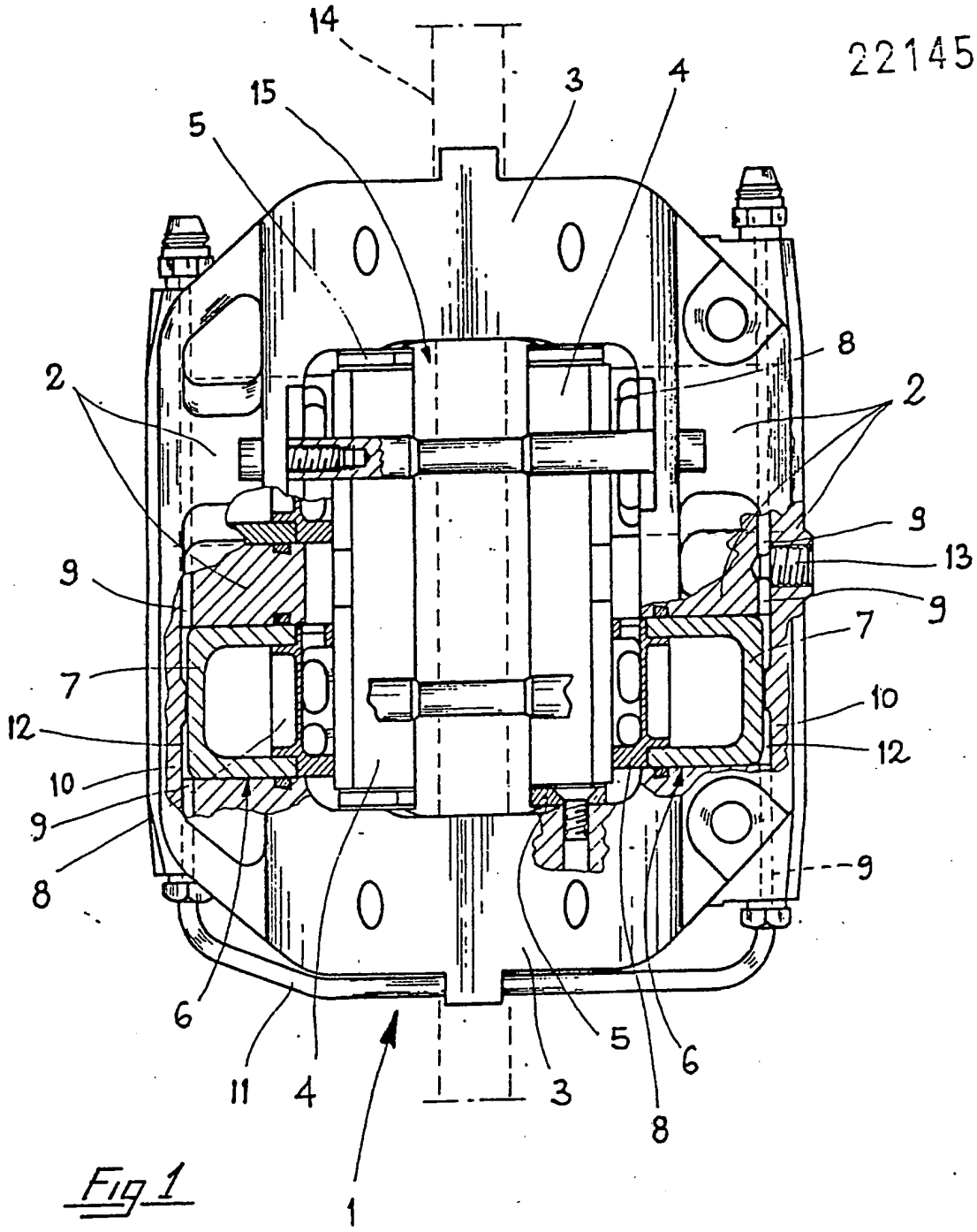

Fig 1

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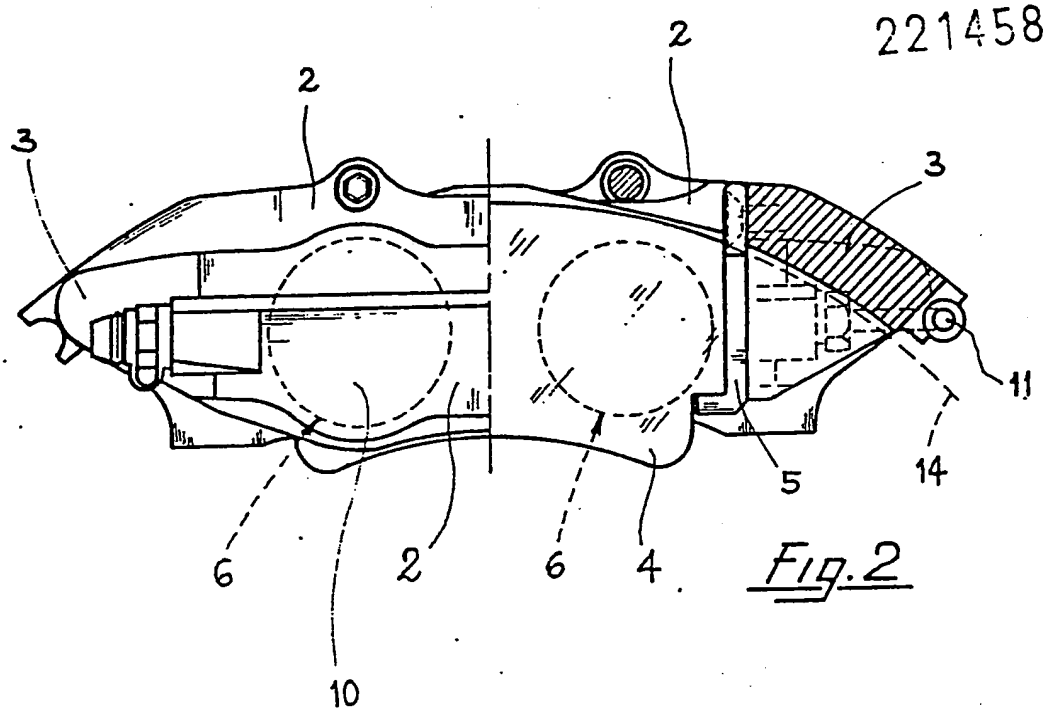

Fig. 2

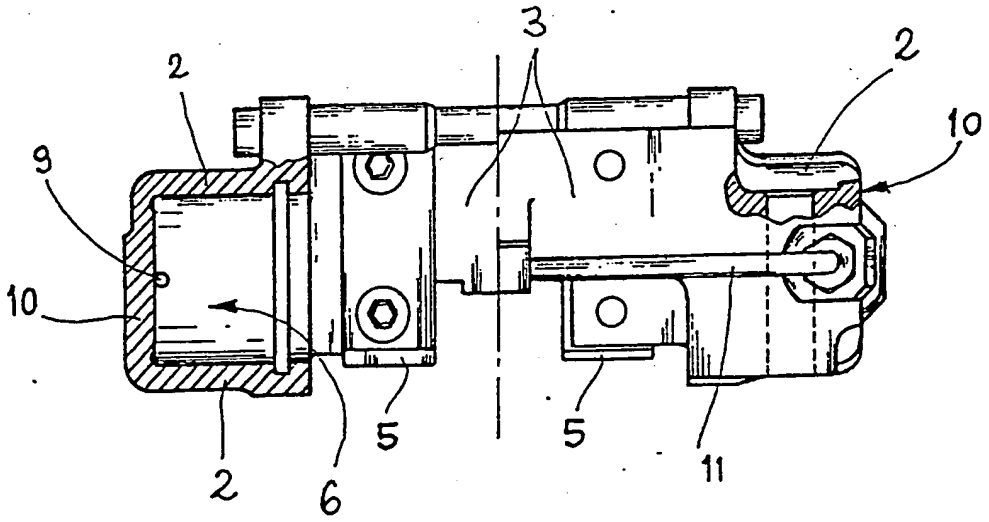

Fig. 3

"ENBLOC STRUCTURE FOR DISC BRAKE UNIT"

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The invention concerns an enbloc structure for disc brake unit, particularly suitable for motor vehicles, and specifically for racing cars, comprising an external enbloc structure in which opposite cylindrical seats are obtained of containers and guide of the mobile drive pistons of the braking pads in friction material.

Said cylindrical seats are obtained from the inner part of the enbloc structure, facing each other and perpendicular to the faces of the disc on which the pads exercise the braking action, while their rear zones, on which the pressing action of the drive fluid is exercised, are substantially integral to the external structure.

The present disc brake units, in particular those applied on racing cars, sports cars and/or touring cars, are substantially of two types.

In one case the structure supporting the drive pistons consists of two opposite coupled brackets, fixed together by means of threaded tie rods. On the opposite, parallel inner faces of each bracket the cylindrical seats of the drive pistons are are obtained, and, alongside same, the means of support of the braking pads are positioned.

Once coupled and stiffly fixed with said tie rods, the brackets form single structures which are mounted on the disc.

In the second case, the opposite brackets are constructed in a single piece and the respective cylindrical seats containing

the mobile drive pistons are obtained in sequence and alignment by means of unique processes which provide the opening of the rear part of said seats on at least one bracket. Subsequently, said opening/openings are sealed by screwing and locking suitable covers.

The disc brake units constructed with the above techniques, while basically valid and functional, still present some particular, undesired problems.

In the versions with coupled brackets, connection is made by means of a plurality of steel tie rods, indispensable to withstand the reaction stress produced during braking, while the brackets are constructed in light alloy to limit weights. Since different materials have different coefficients of expansion, and, during operation, said units may reach decidedly high temperatures, the different behaviour of the materials may cause undesired molding deformations in the connection zones and sometimes even breakage of the tie rods.

Another problem is that the elastic deformations of the structure thus formed are not uniform.

The solution with brackets in a single piece, without transversal tie rods, while not subject to any of the above faults, is not perfectly functional as at least one of the two opposite but integral brackets, containing the cylindrical seats of the mobile drive pistons, is more flexible and deformable than the other due to the presence of the through-holes used

to process said seats, and closed by covers.

Said greater flexibility and/or deformability involves un undesired greater absorption of volume of fluid during braking, which leads to a higher pedal course and action time.

Furthermore, the presence of the covers means a greater axial bulk, while the presence of the gaskets opposite said covers may cause leaks in the hydraulic seal.

The object of the present invention is to eliminate the above problems.

The invention, as characterized by the claims, solves the problem with an enbloc structure for disc brake unit, with which the following results are obtained: the opposite brackets, comprised in a single enbloc structure, present substantially identical conformations; the opposite cylindrical seats containing the mobile drive pistons are obtained in the opposite, integral brackets, by means of processings carried out from the inner part of the brackets outwards, without altering their rear resistant structure.

The advantages of the present invention mainly consist in the the fact that the identical conformation of the opposite, enbloc brackets guarantees their equally identical flexibility and/or elastic deformation under the pressing action which the drive fluid exercises on the pistons; the identical stiffness of the structure, on its two opposite enbloc brackets, guarantees a lower absorption of fluid volume during

brakings with consequent lower pedal course of drive and lower intervention time.

Other advantages consist in the fact that the connecting tie rods have been eliminated; the number of components is reduced; mechanical processings are decreased, and, even to a modest extent, the weights of the structure, the overall dimensions and the possibility of leaks in the hydraulic seal are reduced.

The invention is described in more detail below, with the help of the enclosed drawings which show a preferred constructive example, in which:

Fig. 1 shows a front overall view, partially sectioned, of a complete enbloc structure for disc brake units,

Fig. 2 shows a partially sectioned side view of the same structure and

Fig. 3 shows the same structure in cross-section.

The figures illustrate an enbloc structure for disc brake unit, mainly comprising an external structure (1) formed by opposite, parallel side brackets (2) and connecting crosspieces (3), integral to each other.

The brackets (2) and crosspieces (3) assembly forms a single structure (1), with an opening (15) in the centre, in which the pads of friction material (4) are placed, on the supporting plates (5).

On the opposite inner faces of said brackets (2) the cylin-

drical seats (6) are obtained in which the mobile drive pistons (7) are free to slide, possibly fitted with insulating crowns (8). The opposite cylindrical seats (6) are obtained starting from the inside of the opening (15), located at the centre of the structure (1), and develop in the parallel side brackets (2) for a depth sufficient to contain the mobile drive pistons (7) and connect them to the rear peripheral ducts (9).

An integral part of the rear walls (10) of all cylindrical seats obtained in this way are the corresponding opposite, parallel side brackets (2), so that the latter, in their overall conformation, are substantially identical.

The rear peripheral ducts (9) of the brackets (2), their external connector (11) and the chambers (12) comprised between the bottoms of the pistons (7) and the respective rear walls (10) are filled with drive fluid, preferably coming from a single main connection (13), preferably but not limitatively obtained on one of the parallel side brackets (2). The connection (13) is directly connected, with means not illustrated, to the brake pedal.

During operation, the pressure exercised on the brake pedal is transmitted to the drive fluid, and from this, through the ducts (9) and the external container (11), to the bottoms of the mobile pistons (7) which are pushed outwards along the cylindrical seats (6).

The mobile pistons (7) act on the rear walls of the pads (4) which are pushed into dragging and friction with the disc (14), causing the desired braking action.

Thanks to their identical conformation, the parallel side brackets (2) give the structure (1), to which they are closely connected and counterposed by means of crosspieces (3), a uniform overall stiffness which guarantees a minimum absorption of fluid volume during brakings, a minimum course of the drive pedal and consequently a lower intervention time.

Finally, the parallel side brackets (2), opposite each other but closely connected by means of the crosspieces (3), thanks to their identical conformation, undergo an identical elastic deformation under the effect of the load produced by the fluid against the bottoms of the drive pistons (7). This identical deformation guarantees an identical distribution of the fluid on the opposite pistons with a minimum volume absorption and pedal course.

CLAIMS

1) Enbloc structure for disc brake unit, comprising an external structure (1) formed by opposite, parallel side brackets (2) and connecting crosspieces (3), integral to each other, characterized by the fact that the cylindrical seats (6) containing the mobile drive pistons (7) are comprised in said brackets (2), in opposite alignment, and their rear walls (10) are integral to said brackets which contain them.

2) Enbloc structure according to claim 1, characterized by the fact that the cylindrical seats (6) are substantially facing, in alignment and counterposition, the inside of the opening (15) formed by the abovementioned opposite, parallel side brackets (2) and crosspieces (3), integral to each other.

3) Enbloc structure according to claims 1 and 2, characterized by the fact that the cylindrical seats (6) develop inside the opposite, parallel side brackets (2) for a depth which comprises the length of the drive pistons (7) and the connection with the rear peripheral ducts (9) for the containment and passage of the drive fluid.

4) Enbloc structure according to claims 1 to 3, characterized by the fact that the rear walls (10) of all cylindrical seats (6) are integral to the corresponding opposite, parallel side brackets (2).

5) Enbloc structure according to claims 1 to 4, characterized by the fact that the opposite, parallel side brackets (2), integral to the crosspieces (3), are substantially of identical

structure and stiffness.

6) An enbloc structure for a disc brake unit substantially as described herein with reference to or as illustrated in the accompanying drawings.

7) A disc brake unit incorporating an enbloc structure according to any of Claims 1 to 6.

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